provides sites which are reactive with and which are capable of trapping gases and vapors which poison the precious metal catalyst. The Office action alleges that "a person of ordinary skill in the art would accordingly have had a reasonable expectation of incorporating the coating layer system of Friese et al, with the gas sensor of Jones et al, in order to provide a gas sensor with improved performance characteristics when exposed to contaminants from exhaust gases." The Office action further alleges that "the teachings of Jones et al in view of Friese et al teach and suggest all of the claimed structural limitations, which incorporate the functional aspects of the first and second layers of the coating layer system, of the gas sensing element as recited in Claim 1."

As pointed out in the previous response, while Friese et al may teach the concept of an outer layer which is catalytic towards contaminants only, the Friese et al reference taken as a whole does not teach how to obtain a sensor which operates in a satisfactory manner. In order to elaborate on this point, Applicants now present a declaration of inventor Chuan-Bao Wang reporting on comparative testing carried out with three gas sensors.

The first gas sensor was prepared according to the teachings of the present application, and has an inner layer of oxidation catalyst supported by alumina, and an outer layer of a contaminant catalyst (lithium oxide) also supported by alumina.

Sensor 2, prepared according to the example of Friese et al and corresponding to a combination of the Jones et al and Friese et al references, contains an inner layer which is the same as the inner layer of sensor 1, and further contains an outer layer of contaminant catalyst lithium oxide, but

LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600

prepared as specifically described in the Friese et al reference. According to this method, the outer layer was formed by immersing the inner layer in a solution of lithium nitrate and aluminum nitrate which was allowed to drip off; the sensor was then heat treated for 2 hours at 1000°C to form a lithium aluminum mixed oxide on the surface.

A third sensor was also formed by a method set forth in Friese et al, column 2, by saturating a non-catalytic, aluminum oxide bead with a mixture of catalyst solution (palladium chloride), aluminum nitrate and lithium nitrate, followed by heating.

The three sensors were each paired with a non-catalytic reference bead, and used to detect 1% methane in air. The results are instructive.

The sensor according to the claimed invention (sensor 1) has a sensitivity of 18.2 mV/% methane, while the sensor prepared according to a combination of Jones et al and Friese et al (sensor 2) has a sensitivity of only 0.05 mV/% methane. The sensor prepared from a combination of oxidation catalyst and contaminant catalyst (sensor 3) had a greater sensitivity than the sensor prepared according to the suggested combination of Jones et al and Friese et al, but not nearly as good as the sensor prepared according to the claimed invention.

It can be seen from the above test results that the combination of Jones et al and Friese et al may teach a desirable goal, but does not actually teach one of ordinary skill in the art how to obtain a useful sensor. Only the present application actually teaches one of ordinary skill in the art how to obtain a sensor in which a contaminant catalyst is placed on top of a oxidation catalyst, but without poisoning or otherwise interfering with the oxidation

LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600

catalyst.

Thus, the combination of Jones et al and Friese et al does not actually teach one of ordinary skill in the art how to obtain a useful sensor, and withdrawal of this rejection is requested.

Claim 5 has been rejected under 35 USC 103(a) over Jones et al and Friese et al and further in further view of Cheng et al, and in view of the test results submitted hereinabove, withdrawal of this rejection is requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,

Ira J. Schultz
Registration No. 28666

LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600